



Methods for Irrigation and Agriculture  
لتطوير أساليب الري والزراعة

**NEWSLETTER**  
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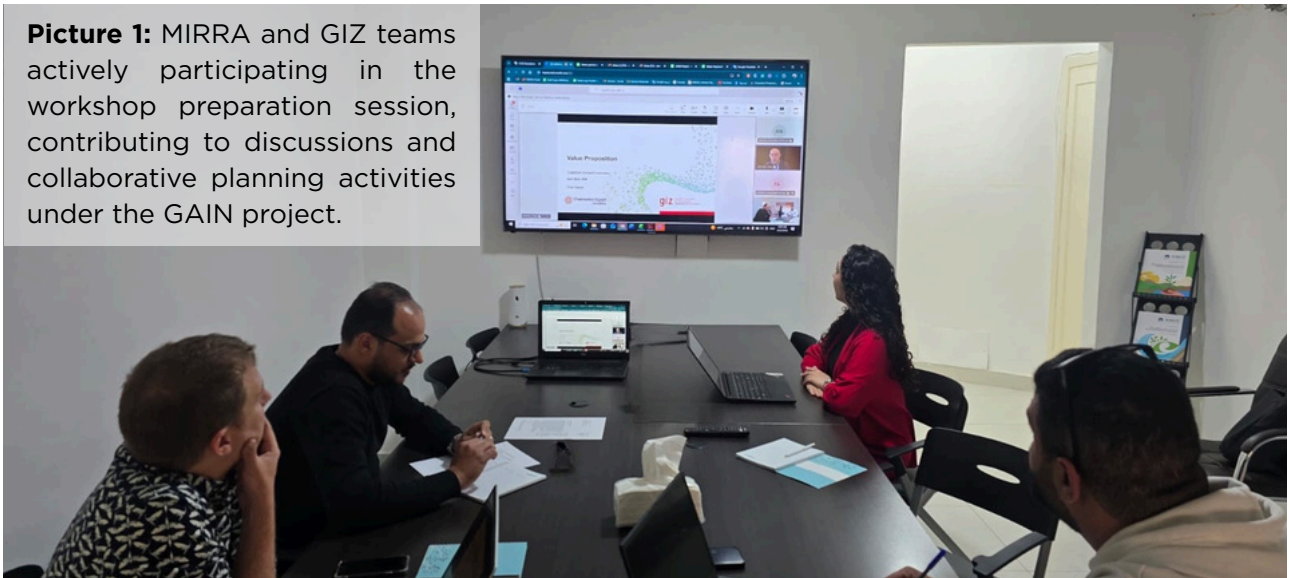
A Climate-Resilient Cereal for Sustainable Dryland Agriculture

# From Understanding to Action: Shaping MIRRA's Role in Supporting AgriTech SMEs

**As part of the GAIN project,** MIRRA hosted a focused working session aimed at defining its role in supporting AgriTech SMEs through a structured Business Model and Value Proposition development process.

The session was built on a practical, step-by-step methodology that moved from understanding SMEs' real challenges to translating these insights into clear, actionable service concepts.

**Picture 1:** MIRRA and GIZ teams actively participating in the workshop preparation session, contributing to discussions and collaborative planning activities under the GAIN project.



## From Assumptions to Evidence

The session started with a strong emphasis on customer-centered thinking, moving beyond assumptions to identify real needs. As highlighted during the Customer Discovery phase, “building something nobody needs” remains the most common reason solutions fail.

Through guided exercises, MIRRA's team, with the support of the Chemonics team, worked on identifying and prioritizing key SME challenges, structuring them into:



## Key Outcomes: Understanding SME Needs

The session resulted in a structured understanding of what SMEs in the AgriTech sector are trying to achieve, including:

- Developing and improving agri-tech products
- Accessing new markets
- Building evidence-based promotion strategies
- Meeting compliance and certification requirements
- Strengthening data-driven decision-making

At the same time, several critical barriers were identified:

- Limited access to reliable data and field validation
- High uncertainty in product performance and market fit
- Weak connectivity between SMEs and farmers
- Limited agronomy knowledge and technical validation capacity

**Picture 2:** Eng. Maram Zaid documenting key discussion points during the Value Proposition and Customer Profile exercise.

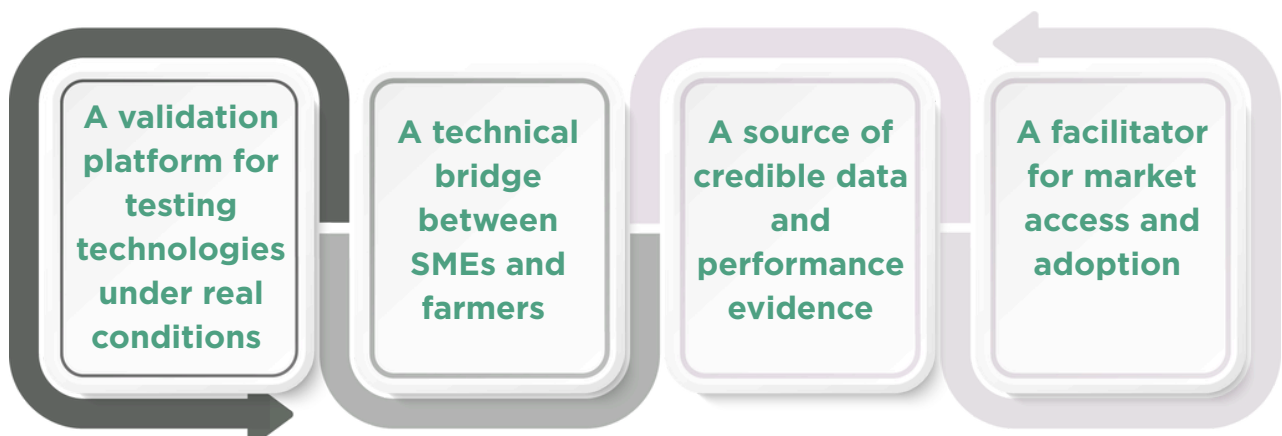


These insights directly reflect the broader sector challenges highlighted in MIRRA's AgriTech Field Lab concept, particularly the gap between innovation and real farm application .

## Defining Value: MIRRA's Strategic Role

Building on these findings, the session transitioned into the Value Proposition phase, where MIRRA's role was reframed not just as a service provider, but as a catalyst of value creation for SMEs .

The outcomes clearly positioned MIRRA as:





**Picture 3:** MIRRA and GIZ teams during the interactive working session under the GAIN project, collaboratively developing MIRRA's Business Model and Value Proposition to better support AgriTech SMEs.

## From Value to Business Model

The final part of the session focused on translating this value into a structured business model, ensuring that services are not only relevant, but also deliver measurable impact and can be sustained over time.

**The team worked on linking:**

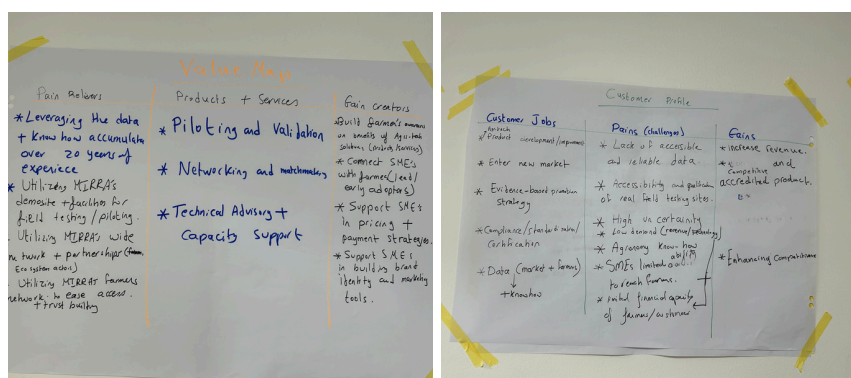
Customer segments

Value propositions

Service delivery mechanisms

Operational and financial logic

This shift from activity-based thinking to business model thinking is critical, as effective support is not defined by the number of activities delivered, but by the real change created at the SME level .



**Picture 4-5:** Customer Profile and Value Map outputs developed during the session, highlighting SMEs' pain points, expected gains, and the proposed services and support mechanisms provided by MIRRA.

## Looking Ahead

This session represents a key step in shaping MIRRA's approach within the GAIN project. By grounding its services in real SME needs and aligning them with a clear value proposition and business model, MIRRA is strengthening its role as a driver of innovation, validation, and impact in the AgriTech ecosystem.

**Picture 1:** Farmer Abu Mahmoud operating a tractor in the field, illustrating the essential role of farmers in managing day-to-day agricultural operations and their direct influence on productivity, crop quality, and the agri-food value chain.



At the foundation of the agri-food value chain, farmers are the primary drivers of food availability, quality, and continuity. Their day-to-day decisions ranging from crop management to harvesting practices directly influence the efficiency and resilience of the entire system. Despite this pivotal role, the on-farm stage remains one of the most critical points where substantial food losses occur, often before produce even enters the market

**Food loss at the farm level** is not an isolated incident but a systemic challenge embedded throughout the production cycle. From cultivation to harvest, multiple interrelated factors shape production outcomes. Climate variability, increasing pest and disease pressures, and labor shortages during peak periods all contribute to reduced yields and compromised product quality.



**Picture 2:** Cherry tomato fruits affected by the whitefly pest.

Beyond these technical constraints, farmers operate within volatile and often unpredictable market conditions. In many cases, crops are deliberately left unharvested not due to quality concerns, but because market prices fail to cover production and harvesting costs. This economic imbalance results in significant quantities of fresh, nutritious food being lost at source, highlighting a critical disconnect between production systems and market structures.



**Picture 3:** Harvested tomatoes packed in crates in the field, showing the harvest stage and the link between production and post-harvest handling before reaching the market.

Despite these constraints, farmers continuously demonstrate resilience and adaptive capacity. On-farm strategies to mitigate losses are often rooted in resource efficiency and circularity. Surplus or substandard produce is frequently repurposed as animal feed or reincorporated into the soil as organic matter, contributing to improved soil health and reduced input dependency. While these practices are valuable, they remain insufficient in addressing the broader economic implications of food loss.

Persistent structural barriers continue to exacerbate the issue. Limited access to post-harvest infrastructure, including cold storage and transportation, inadequate technical support, and weak integration into formal markets all constrain farmers' ability to minimize losses and maximize value.

Addressing on-farm food loss therefore requires a holistic and integrated approach that aligns production systems with market realities. In this context, initiatives such as the FUSION project play a critical role. By combining technological innovation, targeted capacity-building, and ICT-based monitoring tools, the project aims to enhance the prediction and management of shelf life and quality particularly for perishable crops such as tomatoes and peppers across the Mediterranean region.

Through its engagement in the FUSION project, the MIRRA team contributes to translating farmers' challenges into actionable solutions. By amplifying farmers' voices and connecting them with data-driven tools and practical interventions, these efforts support the transition toward more efficient, resilient, and sustainable agri-food value chains.



**Picture 4:** Pepper plants at farm in the Northern Jordan Valley.

### Overview

Barley (*Hordeum vulgare L.*) is one of the oldest domesticated cereal crops and a key component of dryland agriculture systems. It is widely cultivated in Mediterranean and semi-arid regions due to its strong tolerance to drought, salinity, and temperature variability.

Barley is considered a climate-smart crop, maintaining stable yields under water-limited conditions where other cereals (e.g., wheat) struggle.

### Scientific Evidence:

- Requires **30-40%** less water than wheat for comparable biomass production (FAO, ICARDA).
- Exhibits higher water productivity under deficit irrigation conditions.

### Nutritional & Food Security Value

- Rich in  **$\beta$ -glucans** → reduces LDL cholesterol (EFSA approved)
- High dietary fiber (**15-20%**)
- Moderate protein content (**10-12%**)
- Low glycemic index → **suitable for diabetes diets**
- Uses:

Human consumption (bread, soups, traditional foods)	Animal feed (major global feed grain)	Malting (beer industry)
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### Scientific Evidence:

- $\beta$ -glucans improve cardiovascular health (EFSA, 2011)
- Reduces postprandial glucose response (Journal of Nutrition studies)



## Environmental Benefits



### Soil & Ecosystem Services

- Improves soil structure and organic matter through extensive root systems
- Enhances soil carbon sequestration in conservation systems
- Suitable for crop rotations, especially with legumes (e.g., faba bean)



### Water Efficiency

- High water-use efficiency (WUE) compared to wheat
- Can produce grain under 200-300 mm rainfall

### Climate Adaptation

- High tolerance to:
  - Drought
  - Salinity (up to EC ~8 dS/m depending on variety)
  - Temperature extremes



### Scientific Evidence:

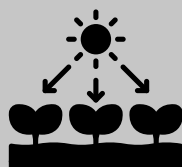
- ICARDA: Barley yields remain stable under **<250 mm rainfall**
- FAO: Barley ranked among the most drought-resilient cereals

### Quick Facts



#### Crop type

Cereal  
(Poaceae)



#### Photosynthesis

C3  
plant



#### Water needs

Low  
(200-400 mm/year)



#### Farming system

Rainfed / marginal  
lands

### Role in Sustainable Agriculture

- Suitable for low-input systems
- Key crop in conservation agriculture (minimum tillage, residue retention)
- Improves rotation performance (Barley → Legume → better nitrogen balance)
- Fits integrated crop-livestock systems

### Scientific Evidence:

- Barley-based rotations improve nitrogen use efficiency and reduce fertilizer needs (ICARDA).

## Socio-Economic Impact

- Critical for smallholder farmers in drylands
- Lower production risk compared to wheat
- Supports:
  - Livestock sector (feed security)
  - Agro-industrial value chains (malting industry)
- Provides income stability in climate-variable regions



## Challenges

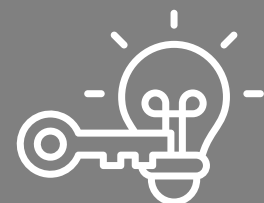
- Susceptibility to:
  - Net blotch (*Pyrenophora teres*)
  - Powdery mildew
- Market preference often favors wheat over barley
- Limited processing infrastructure for food-grade barley
- Yield variability under extreme climate events



## Key Message

Barley represents a **strategic climate-resilient cereal** capable of sustaining agricultural productivity under water scarcity and environmental stress.

It serves as a **bridge between traditional dryland farming systems and modern climate-smart agriculture**, offering **high stability, resource efficiency, and multifunctional value** within the NUSTALGIC framework.





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